National Institute of Environmental Health Sciences

Association between rainfall and pediatric emergency department visits for acute gastrointestinal illness

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Abstract:

BACKGROUND: Microbial water contamination after periods of heavy rainfall is well described, but its link to acute gastrointestinal illness (AGI) in children is not well known. OBJECTIVES: We hypothesize an association between rainfall and pediatric emergency department (ED) visits for AGI that may represent an unrecognized, endemic burden of pediatric disease in a major U.S. metropolitan area served by municipal drinking water systems. METHODS: We conducted a retrospective time series analysis of visits to the Children's Hospital of Wisconsin ED in Wauwatosa, Wisconsin. Daily visit totals of discharge International Classification of Diseases, 9th Revision codes of gastroenteritis or diarrhea were collected along with daily rainfall totals during the study period from 2002 to 2007. We used an autoregressive moving average model, adjusting for confounding variables such as sewage release events and season, to look for an association between daily visits and rainfall after a lag of 1-7 days. RESULTS: A total of 17,357 AGI visits were identified (mean daily total, 7.9; range, 0-56). Any rainfall 4 days prior was significantly associated with an 11% increase in AGI visits. Expected seasonal effects were also seen, with increased AGI visits in winter months. CONCLUSIONS: We observed a significant association between rainfall and pediatric ED visits for AGI, suggesting a waterborne component of disease transmission in this population. The observed increase in ED visits for AGI occurred in the absence of any disease outbreaks reported to public health officials in our region, suggesting that rainfall-associated illness may be underestimated. Further study is warranted to better address this association.

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Resource Description

Exposure : ☑

weather or climate related pathway by which climate change affects health

Food/Water Quality, Precipitation

Food/Water Quality: Pathogen

Geographic Feature: ☑

resource focuses on specific type of geography

None or Unspecified

Geographic Location: ☑

resource focuses on specific location

United States

Health Impact:

specification of health effect or disease related to climate change exposure

Infectious Disease, Injury, Other Health Impact

Infectious Disease: Foodborne/Waterborne Disease

Foodborne/Waterborne Disease: Campylobacteriosis, Cryptosporidiosis, E. coli, Giardiasis, Norovirus, Rotavirus, Salmonellosis, Other Diarrheal Disease

Other Health Impact: Emergency Department Visits

Population of Concern: A focus of content

Population of Concern:

populations at particular risk or vulnerability to climate change impacts

Children

Resource Type:

format or standard characteristic of resource

Research Article

Timescale:

time period studied

Time Scale Unspecified